

REMARKS

Applicants have amended Claims 1, 8 and 9 and have added new Claim 22. Support for the amendment can be found generally throughout the text; specifically, at page 9, line 14 through page 10, line 26 and the Examples. Applicants submit no new matter has been added by the present amendment.

Rejection under the Judicially Created Doctrine of Obviousness-Type Double Patenting

Claims 1, 2, 4-10, 15, 20 and 21 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1-8 of U.S. Patent No. 6,908,965.

Applicants herein submit a Terminal Disclaimer in compliance with 37 CFR 1.321(c) and accordingly request withdrawal of this ground of rejection.

Claim Rejection - 35 U.S.C. § 103(a)

Claims 1, 2, 4-10, 15, 20 and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Obrecht et al. (U.S. Patent No. 6,127,488) or DE 19707487, each in view of Dammann et al. or JP 57-212239 or JP 5-17630.

Applicants maintain their previous traversal of this ground of rejection. The present invention is directed to rubber mixtures comprising uncrosslinked, double-bond-containing rubbers (A), crosslinked rubber particles (B), multifunctional isocyanates (C), and a crosslinking agent wherein the amount of component (B) in the mixture is from 1 to 150 parts by weight and the amount of multifunctional isocyanates (C) is from 1 to 100 parts by weight, in each case based on 100 parts by weight (phr) of the rubber component (A) and wherein said crosslinked rubber particles (B) have particle diameters of from 5 to 1000 nm and swelling indices in toluene of from 1 to 15 and wherein the gel content of the rubber particles (B) is from 80 to 100 wt.%.

Applicants again submit that the cited references, alone or in combination, fail to render the present invention obvious and Applicants submit there is no motivation present in the references to combine the representative teachings to arrive at the instant invention.

The Office Action implies that "multifunctional isocyanates are standard " in the rubber industry and at page 4 the Office Action states "the use of polyisocyanates within rubber mixtures to improve physical properties was known at the time of invention". Applicants submit there is no literature available which teaches the use of:

rubber + a crosslinking agent (such as a sulfur cure system) +
multifunctional isocyanates + other rubber additives.

The cited references do not teach or suggest this combination nor does the rubber handbook.

As discussed above, the present invention is directed to:

rubber + a rubber particle (gel) + a crosslinking agent (such as sulfur cure system) + multifunctional isocyanates + rubber additives.

And as discussed in length in the previous responses, the claimed rubber vulcanizates have surprisingly good properties.

Dammann et al. discloses an adhesive mixture which contains:

1) rubber + precrosslinked rubber + 2) multifunctional isocyanate. Dammann et al. does not disclose the use of a crosslinking agent as the present invention. Despite the assertion in the Office Action to the contrary, Dammann et al. does not disclose adding a crosslinking agent to the adhesive rubber mixture. In the alternative, as clearly discussed in the cited portion of Dammann et al., the first ingredient is a butyl rubber which is crosslinked. Accordingly, Dammann et al. does not teach the use of a crosslinking agent as added in the present claims.

Likewise, as discussed previously, Obrecht et al. discloses a rubber compound which contains:

rubber + rubber gel + sulfur cure system + rubber additives (without multifunctional isocyanates).

Applicants again submit the combination of Obrecht et al. in view of Dammann et al. is not obvious, because Dammann et al. only discloses properties which are relevant for an adhesive but not for a vulcanizate, i.e., a rubber mixture, wherein the rubber mixture has been crosslinked with a crosslinking agent. Applicants submit it is helpful in this context to emphasize that various compounds do not result in good vulcanizate properties and therefore one skilled in the art would not be motivated to combine the teachings.

For instance, a rubber + precrosslinked rubber + multifunctional isocyanate, as disclosed by Dammann et al. is a good adhesive but, as is known to one skilled in the art, an adhesive sticks to vulcanized rubber severely. A rubber vulcanizate should not be sticky and should exhibit a property profile as outlined in the present invention. Also, as disclosed in Example 1 of the present invention, a compound containing a rubber + sulfur cure system + multifunctional isocyanate has inferior properties which is in direct contradiction to the notion as stated in the Office Action, that the use of a polyisocyanate within a rubber mixture is known to improve physical properties.

As discussed, Dammann et al. discloses an adhesive mixture which does not contain the ingredients of a crosslinking agent such as, for example, a sulfur cure system. According to Dammann et al. teaching the adhesive compound seems to harden at ambient temperature. According to Dammann et al. a vulcanization at elevated temperature > 120°C preferably >> 140°C is not performed. See the Examples of Dammann et al.

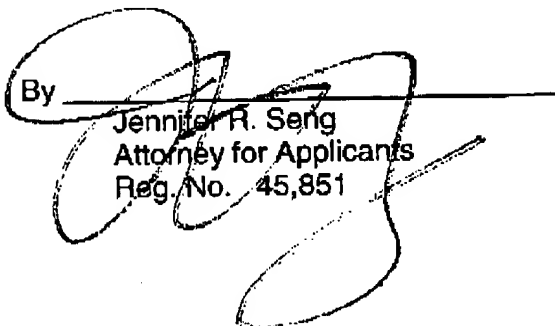
Whereas, in the present invention, the rubber mixture is vulcanized at > 140°C preferably > 150°C, as described clearly in the Examples of the present invention.

Likewise, JP 57-212239 discloses a mixture of the following components: a rubber consisting of (i) 70 – 95 parts of solid rubber and (ii) 30 – 5 parts of liquid rubber; (B) a masked isocyanate; and (C) Novolac. JP 5-17630 discloses a mixture containing a powdered rubber, a rubber solution in an inert solvent containing a hydroxyl-modified liquid rubber and a polyfunctional isocyanate.

Applicants submit the secondary cited references teach adhesive compositions, not rubber mixtures which are vulcanizable. Applicants also submit that the fact that the claimed invention is within the capabilities of one of ordinary skill in the art is not sufficient to establish prima facie obviousness.

Therefore, Applicants request withdrawal of this ground of rejection.

Respectfully submitted,

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